No of Pages : 2 **Course Code : 12M025**

Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, AUGUST / SEPTEMBER - 2015

BE – PRODUCTION ENGINEERING Semester : 6

12M025 AUTOMOBILE ENGINEERING

Time : 3 Hours **Maximum Marks : 100**

INSTRUCTIONS:
1. Answer **ALL** questions from GROUP – I.
2. Answer any **FIVE** questions from GROUP – II.
3. Answer any **ONE** question from GROUP – III.
4. Ignore the box titled as **“Answers for Group III”** in the Main Answer Book.

GROUP - I

Marks : 10 x 3 = 30

1. Classify chassis based on number of wheels.
2. How diesel engines are identified at the moment of seeing any IC engine?
3. What is the function of flywheel used in IC engine? How the speed is maintained through the cycle?
4. What is the difference between centrifugal and semi-centrifugal clutches?
5. Why is rear axle in two halves?
6. How vehicle is kept stationary while using sliding mesh gear box?
7. Why is a slip joint necessarily to be used with the propeller shaft?
8. What is meant by the aspect ratio of a tyre? Mention its significance.
9. List any three advantages of disc brake over drum brake.
10. What is the cause for more wear on one side than the other, in the front wheels?

GROUP - II

Marks : 5 x 10 = 50

11. What are the different loads acting on chassis and explain briefly?
12. A vehicle of mass is 1200 kg has a wheel base of 2.5 m. The centre of gravity of the vehicle is at a height of 0.65 m above ground level and 1.2 m behind the front axle. If the vehicle accelerates at 5 m/sec^2 calculate

    (a) The amount of load transfer

    (b) The dynamic loads on the front and rear axles.

13. How does a planetary gear system provide different speeds? Briefly describe the construction and working of a planetary gear system.

14. Explain the working of a diaphragm clutch with neat sketch.

15. Explain briefly the following independent suspension systems used in automobiles:

    (i) Wishbone arm system (ii) MacPherson strut assembly

16. Describe in detail constructional features of tubed and tubeless tyres for automotive use. List also their relative merits and demerits

GROUP - III **Marks : 1 x 20 = 20**

17. Derive suitable expression to find out the reaction forces at front and rear wheels of a vehicle when the brakes are applied on the (i) front wheel (ii) rear wheel and (iii) all the four wheels considering the vehicle is moving downhill. Using these expressions solve the following problem.

    The wheel base of a vehicle travelling on a wet road sloping upwards at angle $\theta = \sin^{-1} 0.1$, is 5 m. Its centre of gravity is 2 m ahead of the rear and 750 mm above the road. The coefficient of adhesion between the vehicle tyres and the road is 0.3. The vehicle employs brakes on all the four wheels. Determine:

    (a) Ratio of braking force on front and rear wheels if skidding is to be avoided.

    (b) Stopping distance for the vehicle travelling at a speed of 45 km/hour when the engine is stopped and brakes are applied.

18. Derive the expression for basic condition for a perfect steering mechanism and discuss in detail the Ackermann and Davis steering mechanism.

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FD/JU